



EDITORIAL

Breastfeeding in the first hour of life protects against neonatal mortality^{☆,☆☆}

Aleitamento materno na primeira hora de vida protege contra mortalidade neonatal

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Context

More than four million babies die in the neonatal period every year, and most of these deaths occur in poorer countries.¹ The longer the delay in breastfeeding initiation, the greater the chances of neonatal mortality caused by infections.² Breastfeeding within the first hour of life has been shown to reduce high neonatal mortality by 22%.³ During this sensitive period, the protective effect of breastfeeding delivered by colostrum may be related to a range of mechanisms that include intestinal colonization by specific bacteria found in maternal milk, and the ability of breast milk to produce bioactive immune factors suitable for the newborn. The Baby-Friendly Initiative (BFI) of the World Health Organization (WHO) recommends placing babies in skin-to-skin contact with their mothers immediately after birth for at least one hour and helping mothers to recognize when their babies are ready to breastfeed.⁴ This aid to mothers in the initiation of breastfeeding corresponds to the step four of the BFI (Table 1).⁵

In this edition of the *Jornal de Pediatria*, Boccolini et al. report on an ecological study using data from 67 countries obtained from the Demographic and Health Surveys (DHS) up to 2008 to assess the correlation

between breastfeeding in the first hour of life and rates of neonatal mortality.⁶

Methods

Using an ecological study design, 67 countries performed at least one national survey according to the DHS guidelines. The data are recognized by the international community on location regarded maternal and child health and nutrition, and were publicly available. Data from the studies were collected in a standardized way, and were used to achieve a representative sample from each country where the research was conducted. The aim was to test for associations between the proportion of infants breastfed in the first hour of life and neonatal mortality rates (number of deaths of children under 28 days of life per 1,000 live births). To adjust for potential confounding factors, information on the percentage of deliveries in health facilities and on the percentage of people with secondary education or higher were obtained. Countries were divided into tertiles of mothers breastfeeding within the first hour of life; those with lower percentages were included in the first tertile. The authors present a model with log-linear distribution

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Table 1 Ten steps to successful breastfeeding.^a

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff
2. Train all health care staff in skills necessary to implement this policy
3. Inform all pregnant women about the benefits and management of breastfeeding
4. Help mothers initiate breastfeeding within half an hour of birth^b
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants
6. Give newborn infants no food or drink other than breast milk unless medically indicated
7. Practice rooming in - that is, allow mothers and infants to remain together - 24 hours a day
8. Encourage breastfeeding on demand
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic

^aAdapted from Semantic et al.¹³ and from World Health Organization and United Nations Child's Fund.⁵

^bThe 2009 revision of the Baby Friendly Hospital Initiative now interprets this step as "Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognise when their babies are ready to breastfeed and offer help if needed".

using the rate of neonatal mortality as the outcome and the percentage of breastfeeding within the first hour of life as the exposure, adjusting for the percentage of deliveries in health facilities and the percentage of people with secondary education or higher in each country.

Findings and commentary

Using countries whose data from these surveys were available, the main findings from this ecological study across 67 countries confirmed that breastfeeding within the first hour of life was significantly and inversely correlated with neonatal mortality. The implication of this finding is that breastfeeding in the first hour of life was associated with less neonatal mortality; the correlation was stronger among countries with more deaths, and countries with the lowest breastfeeding rates had higher mortality rates that were significant even after adjusting for potential confounders.

In countries with neonatal mortality rates higher than 29 per 1,000 live births, the correlation with maternal milk in the first hour of life was stronger in relation to the percentage of deliveries in health facilities and people with secondary education or higher. In countries with the highest mortality rates, those included in the lowest tertile of breastfeeding in the first hour of life had the highest rate of neonatal deaths per 1,000 live births, and those included in the highest tertile had the lowest rate of deaths.

Biologically plausible mechanisms through which breastfeeding may impact neonatal mortality have been proposed, such as composition of breast milk changing according to the newborn's need for passive immunological protection. Indeed, several components in breast milk reduce the inflammatory response to stimuli in the newborn intestine. These components include transforming growth factor beta, interleukin-10, erythropoietin, and lactoferrin, which act individually or pleiotropically to contain the immature inflammatory response.⁷ More broadly, protection may be provided through a myriad of factors in maternal milk including bioactive enzymes, hormones, growth factors,

cytokines, and immunological agents that increase and stimulate host defense. Early breast milk has an abundance of cytokines at a time when neonatal organ systems are immature, suggesting that these bioactive components of breast milk may be important in neonatal development.

Human milk provides an abundance of protective mediators to the infant gut, and may compensate for the naïve state of adaptive immunity in the newborn infant.⁸ Many components contribute to a powerful innate immune system within the neonatal gut and in human milk. This innate immune system, as compared to the adaptive immune system, is articulated constitutively and provides rapid and ongoing protection against extensive groups of molecules without generating memory. The neonatal gut, particularly of premature infants, is hypersensitive to pro-inflammatory stimuli and vulnerable to pathogens. The neonatal intestine is colonized by lactic bacteria, and Enterobacteriaceae found in breast milk may reduce intestinal colonization by Gram-negative bacteria among newborns admitted to a neonatal intensive care unit.⁹ One of the most prominent features of breast milk is immunoglobulin-A, found in higher concentrations in colostrum when compared to mature milk.¹⁰ Human milk contains numerous other immunomodulatory molecules that satisfy pro-inflammatory processes, large numbers of quiescent leukocytes of unknown function, as well as glycans, some of which promote colonization by symbionts and others obstruct specific pathogens.⁸ The absence or malfunction of components of these innate immune systems of the gut and milk may allow enteric disease in the newborn to develop and flourish.

Ecological studies are an important and useful approach to establish correlations between exposures and outcomes; however, the correlation between breastfeeding in the first hour of life and neonatal mortality in the study reported in this edition was observed among countries and not among people. In addition, other possible factors related to neonatal mortality besides those related to breastfeeding in the first hour of life may be implicated. When complemented by observational studies controlled for confounding factors, however, ecological studies can

provide compelling evidence of significant public health importance.¹¹

Breastfeeding in the first hour of life is potentially beneficial for all children in all countries, and may be even more so among countries with higher rates of neonatal mortality, which may be explained by the fact that mothers from these countries have less assistance during delivery and birth. However, the benefits of maternal milk in reducing neonatal mortality require implementation of effective maternal and child health programs. Breastfeeding in the first hour of life is recognized by the WHO as an important component in the promotion, protection, and support of breastfeeding, and should be implemented as routine hospital practice in all countries in order to reduce neonatal mortality. Addressing neonatal mortality is essential in order to meet the millennium development goal of reducing child mortality by 2020.¹² Findings from a study in Sub-Saharan Africa showed that promotion of early initiation of breastfeeding has the potential to make a major contribution; 16% of neonatal deaths could be prevented if all infants were breastfed from the first day, and 22% if breastfeeding started within the first hour after birth.³ The findings from observational and ecological studies have important implications for neonatal health programs and policy. Breastfeeding-promotion programs should place considerable emphasis on early initiation of breastfeeding, particularly in less-developed settings, as well as promoting exclusive breastfeeding.

In 2009, the original BFI guidelines were updated and included expansion and integration with other maternal-child health initiatives to optimise infant health outcomes. Growing evidence suggested that the BFI was associated with increased breastfeeding initiation, exclusivity, and duration rates at both hospital and community levels, and in diverse cultural contexts.¹³ However, BFI uptake and implementation continues to vary widely across communities and countries, and falls well short of the target that all maternity facilities worldwide follow the ten steps to successful breastfeeding. Indeed, the number of BFI maternity facilities varies markedly across countries from as high as 50% to as low as 6% in some countries.¹³ BFI is a comprehensive, multicomponent program for implementing evidence-based practices to protect, promote, and support breastfeeding. Effective strategies for wider dissemination, integration, and implementation of BFI are needed to address the increased level of mortality in newborns who are not breastfed within the first hour of life.

Conclusion

The protective effect of breastfeeding during the first hour of life on neonatal mortality demonstrated in this ecological study across 67 countries is consistent with findings from previous observational studies, indicating the importance of skin-to-skin contact and breastfeeding within the first hour of life as routine neonatal care. Since this practice is the fourth step of the BFI, it is suggested that all maternity facilities adopt this initiative.

Implications for practice and research

- Breastfeeding in the first hour of life is protective against mortality in the neonatal period.
- Breast milk is the gold standard for protective nutrients fed to newborn infants.
- All maternity facilities should adopt the BFI as evidence-based best practice.

Conflicts of interest

The author has no conflicts of interest to declare.

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